Journal of Consulting and Clinical Psychology
2005, Vol. 73, No. 3, 561–566

DOI: 10.1037/0022-006X.73.3.561

A Longitudinal Study of Retirement in Older Male Veterans

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In this study, the authors examined the effect of retirement on psychological and physical symptoms in 404 older male veterans who were taking part in an ongoing longitudinal study. Hierarchical linear modeling was used to analyze symptom trajectories from preretirement, peri-retirement, and postretirement periods in veterans with either lifetime full or partial posttraumatic stress disorder (PTSD), trauma exposure only, or no traumatic exposure. As expected, the PTSD group experienced greater increases in psychological and physical symptoms during retirement, relative to the other groups. Retirement due to poor health in the PTSD group did not account for the findings regarding physical symptoms. Results indicate that clinicians should recognize and address the potential for older individuals with PTSD to experience difficulties during retirement.

Veterans with posttraumatic stress disorder (PTSD) may experience symptom reactivation or exacerbation after exposure to new traumatic events or reminders of past trauma (e.g., Long, Chamberlain, & Vincent, 1994; Wolfe, Brown, & Bucsela, 1992). Several investigators (e.g., Elder & Clipp, 1988) have suggested that life events such as retirement also can increase PTSD symptoms. Although retirement outcomes are typically neutral or positive (e.g., Bossé, Spiro, & Levenson, 1997; Midanik, Soghikian, Ransom, & Tekawa, 1995), retirement may be stressful because of the potential losses it entails, such as identity, activities, and income (Bossé, Aldwin, Levenson, & Ekerdt, 1987). Retirement may especially affect traumatized veterans because it could be perceived as a loss similar to that entailed in combat; the loss of work-related social support may serve as a reminder of the loss of friends in battle. Also, retirement-related stressors (such as financial problems) may lead to distress, increased arousal, and sleep problems that in turn could trigger other PTSD symptoms. The decreased amount of structure and task demands of retirement may offer insufficient distraction from troubling thoughts and feelings.

Cross-sectional findings are consistent with the hypothesis that retirement can increase distress in traumatized veterans. According to chart review of data from 20 World War II (WWII) veterans referred for PTSD evaluation, 10 of the 16 veterans (62%) who reported a recent exacerbation of symptoms mentioned retirement as a factor (Kaup, Ruskin, & Nyman, 1994). In a sample of WWII veterans, retirement was cited as a cause of recent reactivation of PTSD symptoms by 20 of the 45 veterans (44%; Macleod, 1994). Prisoners of war who retired for disability-related reasons had a higher prevalence of PTSD relative to a pooled group of prisoners of war who were still working or who had retired for other reasons (Zeiss & Dickman, 1989).

We investigated the effect of retirement on psychological and physical symptoms in a sample of male veterans who served during WWII or the Korean Conflict. Physical symptoms were included because data have shown that trauma exposure and PTSD are related to poor physical health (e.g., Boscarino, 1997; Schnurr et al., 2000). We predicted that symptom worsening during retire-

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This article was presented at the annual meeting of the International Society for Traumatic Stress Studies, New Orleans, Louisiana, November 2004. This research was supported by a grant to Paula P. Schnurr from the Department of Veterans Affairs. The views expressed in this article are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs or the National Center for Posttraumatic Stress Disorder. The Veterans Affairs Normative Aging Study is supported by the Cooperative Studies Program/Epidemiology Research and Information Center, U.S. Department of Veterans Affairs, and is a research component of the Massachusetts Veterans Epidemiology Research and Information Center.

We thank Carolyn Aldwin for helpful discussions during the planning of this study. We also thank Therese Stukel and Eugene Demidenko for consultation regarding the statistical analyses and Alison Paris for assistance with data management.

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ment would be greater in veterans with full or partial PTSD than in nontraumatized veterans or traumatized veterans who did not have PTSD. We also examined whether these groups differed in age at retirement and reasons for retirement because early retirement and negative reasons have been associated with greater distress (Bossé et al., 1997).

Method

Participants

The Normative Aging Study (NAS; Bossé, Ekerdt, & Silbert, 1984) is an ongoing longitudinal study of 2,280 men who were initially selected for good health. Enrollment occurred between the years 1961 and 1968 when the men ranged in age from 21 to 81 years. Of the men, 95% are veterans. Our sample consisted of 404 retired WWII and/or Korean Conflict veterans who also participated in a study of trauma exposure and PTSD (Schnurr, Spiro, Vielhauer, Findler, & Hamblen, 2002). Almost all the participants were White (98.7%, $n = 394$), and 90.1% ($n = 364$) had completed high school. Most (68.1%, $n = 275$) served during WWII, 23.0% ($n = 93$) served in the Korean Conflict, and 8.9% ($n = 36$) served in both.

The following three groups were defined with trauma exposure and PTSD diagnostic information from the measures described below: (a) no exposure, which included 62 men (15.3%) who did not meet *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) criteria for exposure, (b) trauma only, which included 297 men (73.5%) who met *DSM–IV* criteria for exposure but did not have lifetime full or partial PTSD, and (c) PTSD, which included 45 men (11.1%) with lifetime full or partial PTSD.

Measures and Procedure

Questionnaire measures were administered by mail or in person as part of the ongoing investigation of the NAS. A doctoral-level clinical psychologist and two master's-level clinical psychologists conducted interviews. After obtaining informed consent, an interviewer administered the trauma and PTSD measures (see Schnurr et al.'s, 2002, study for a detailed description of the interview procedure used to assess trauma exposure and PTSD).

Trauma exposure. The clinician-administered Brief Trauma Interview (Schnurr et al., 2002) was used to assess exposure to 10 different types of events according to *DSM–IV* criteria (American Psychiatric Association, 1994). Schnurr et al. (2002) reported kappa coefficients for exposure ranging from .74 to 1.00 for all events except other life-threatening events ($\kappa = .17$), which were reported by less than 5% of the sample. Schnurr et al. also reported that criterion validity was good; for example, PTSD symptom severity was correlated with the number of reported events.

PTSD. *DSM–IV* diagnoses of current and lifetime PTSD were made with the Clinician-Administered PTSD Scale (Weathers, Keane, & Davidson, 2001). The frequency and intensity of each of the 17 *DSM–IV* PTSD symptoms were rated on a 5-point scale ranging from 0 (*symptom did not occur*) to 4 (*maximum frequency or intensity*). The "1, 2" rule (e.g., see Weathers et al., 2001), which requires that frequency be greater than or equal to 1 and intensity be greater than or equal to 2, was used to determine symptom presence. Current and lifetime partial PTSD were defined as meeting A (exposure), E (duration), and F (impairment–distress) criteria along with (a) meeting B (reexperiencing) and D (hyperarousal) or (b) meeting B and having at least one C (avoidance–numbing) and one D symptom (Schnurr, Friedman, & Rosenberg, 1993). Current and lifetime severity scores were calculated by summing the frequency and intensity of all 17 symptoms. Schnurr et al. (2002) found excellent interrater reliability for diagnostic classification and severity scores.

Retirement. Information about retirement date and reason for retirement was collected on multiple occasions as part of ongoing NAS investigations. Reason for retirement was coded as positive (leisure–new lifestyle, new career–part-time, readiness), health related, or other negative (compulsory–lost job, dissatisfaction–strain, tired of work, family pressure).

Cornell Medical Index (CMI). Psychological and physical symptoms were assessed with the CMI (Brodman, Erdman, & Wolff, 1956), a questionnaire that assesses symptom presence dichotomously (yes–no). The CMI has been administered to NAS participants every 3–5 years since the study began. Number of psychological symptoms (of 44) and physical symptoms (of 131) were scored according to rules used by Aldwin, Spiro, Levenson, and Bossé (1989). On average, participants had 7.95 observations for psychological symptoms ($SD = 2.08$, range = 1–11) and 7.93 observations for physical symptoms ($SD = 2.08$, range = 1–11).

For each participant, the three phases of retirement (preretirement, peri-retirement, and postretirement) were based on cutoffs specific to that participant's date of retirement. Observations up to but not including the observation just before retirement were considered as preretirement, observations right before and right after retirement were considered as peri-retirement, and observations after that were considered as postretirement. For psychological symptoms, preretirement observations occurred an average of 3.03 ($SD = 4.48$) years before and 1.88 ($SD = 1.59$) years after retirement. For physical symptoms, these figures were 3.02 ($SD = 4.47$) years before and 1.93 ($SD = 1.89$) years after, respectively.

Statistical Analyses

We used SPSS NOMREG to perform multinomial logistic regression to examine reasons for retirement, estimating odds ratios for health-related and other negative reasons relative to positive reasons. We fit random regression models (Gibbons et al., 1993) using SAS PROC MIXED to examine changes in psychological and physical symptoms over time. These models estimate individual trajectories with longitudinal measurements and yield valid inferences even when participants vary in the number of observations and the intervals between observations.

We hypothesized a nonlinear trajectory for each individual that differed among the three exposure–PTSD groups. This was supported by an examination of exploratory plots of the CMI data. On the basis of our hypotheses and these plots, we modeled the data using a three-piece linear mixed model. Because people retired at different ages, we anchored the model to each person's retirement date. We modeled time as three linear fixed effects: preretirement, peri-retirement (the observations just before and just after retirement), and postretirement. Because most participants had observations within $\pm$ 3 years of their retirement, the preretirement, peri-retirement, and postretirement slopes were consistent across people, regardless of when a person retired. Approximately 75% of the sample had eight or more observations, and 91% had at least one observation before and one after retirement, which was sufficient to estimate the slopes with acceptable accuracy.

Other fixed effects included the exposure–PTSD group, the three Group $\times$ Time interactions, and age at retirement (to adjust for the differences in age). The Group $\times$ Time interactions tested whether the slopes during each phase differed among groups. The interactions for the peri-retirement and postretirement phases were parameterized to account for differences among slopes in the prior phase. Specifically, the Peri-Retirement $\times$ Group interaction provided the test of our primary hypothesis while allowing for the possibility that the exposure–PTSD groups had different trajectories even before retirement. The Postretirement $\times$ Group interaction provided a test of whether there were further differences among groups in trajectories after the peri-retirement phase while allowing for the possibility of the expected group differences during peri-retirement. The model also included a subject-specific (random) effect, that is, a random

intercept that accounted for differences in covariates among participants at the start of the study.

Results

Most participants (84.7%, $n = 342$) had experienced a traumatic event ($M = 2.04$, $SD = 1.53$, range = 0–8); 69.0% ($n = 236$) had experienced more than one event type. The most common events were war-zone exposure (49.5%, $n = 200$) and witnessing a serious injury or death (30.2%, $n = 122$). The least common events were sexual assault (3.5%, $n = 14$) and childhood physical abuse (4.2%, $n = 17$). Just over 11.0% of the sample had lifetime full (1.7%, $n = 7$) or partial (9.4%, $n = 38$) PTSD, and 3.2% had current full (0.7%, $n = 3$) or partial (2.5%, $n = 10$) PTSD.

As shown in Table 1, the men in the PTSD group were exposed to more event types relative to the men in the trauma only group, $t(340) = 5.14$, $p < .001$. The PTSD group also had higher lifetime and current PTSD symptom severity, $t(340) = 22.18$, $p < .001$, and $t(340) = 10.13$, $p < .001$, respectively. Although the three groups did not differ in age at retirement (Fs < 1), they differed in reason for retirement, log-likelihood $\chi^2(4, N = 401) = 11.35$, $p < .05$ (see Table 1). Men in the PTSD group were more likely than men in the no exposure and trauma only groups to retire for a health-related (vs. positive) reason. Men in the PTSD group also were more likely than men in the trauma only group to retire for other negative (vs. positive) reasons.

There was a main effect of group on psychological symptoms, $F(2, 2799) = 3.01$, $p < .05$. Although symptoms levels were low, the PTSD group had more symptoms relative to the trauma only group ($p < .05$); the difference between the PTSD and no exposure groups was marginally significant ($p = .09$). There was a significant main effect of time indicating modest increase during preretirement, $F(1, 2799) = 5.14$, $p < .05$, but no effect of time during peri-retirement or postretirement (Fs < 1). As expected, there was a significant Group × Time interaction during peri-retirement, $F(2, 2799) = 3.32$, $p < .05$, but not during pre- or postretirement (Fs < 1). Table 2 contains information about the specific contrasts in slopes between the PTSD group and the other groups during each phase. As shown in Table 2, symptoms increased during retirement in the PTSD group relative to the other groups. To facilitate interpretation, we used the regression model to compute the predicted psychological symptom trajectory for a person in each of the three groups who retires at the age of 65 years. Figure 1 illustrates the unique symptom increase in the PTSD group during peri-retirement and the similarities in group slopes during pre- and postretirement.

There also was a main effect of group on physical symptoms, $F(2, 2788) = 9.31$, $p < .001$. The PTSD group had more physical symptoms relative to the other groups (ps < .001). There was a significant main effect of time, indicating symptom increase, during preretirement, $F(1, 2788) = 315.55$, $p < .001$; peri-retirement, $F(1, 2788) = 59.22$, $p < .001$; and postretirement, $F(1, 2788) = 27.29$, $p < .001$. There was a significant Group × Time interaction during preretirement, $F(2, 2788) = 5.70$, $p < .01$, and peri-retirement, $F(2, 2788) = 17.59$, $p < .001$. As shown in Table 2, symptom increase prior to retirement was greater in the PTSD group than in either of the other groups. However, as expected, the difference in slopes became even greater during retirement. The absence of a Group × Time interaction during postretirement indicates that the differential change in the PTSD group did not continue. Figure 2 shows the predicted physical symptom trajectory for a person in each of the three groups who retires at the age of 65 years. Figure 2 illustrates how the relatively steeper trajectory in the PTSD group becomes even steeper during retirement.

We reanalyzed the physical symptom data using health-related retirement (vs. other negative or positive) reasons as a covariate to assess the possibility that the results for physical symptoms could be explained by veterans with PTSD being more likely than veterans without PTSD to retire because of poor health. The results were comparable with those from the unadjusted analyses.

Discussion

We examined the effect of retirement on psychological and physical symptoms in older male veterans. As expected, veterans with full or partial lifetime PTSD had greater symptom increases during retirement, relative to veterans who had never been exposed to trauma or who did not develop PTSD following exposure. After retirement, groups did not differ in rate of symptom change. Our

Table 1
Trauma, PTSD, and Retirement Characteristics in Older Veterans (N = 404)

Variable	No exposure $n = 62$	Trauma only $n = 297$[a]	PTSD $n = 45$
No. of traumatic event types (*SD*)***		2.27 (1.30)	3.36 (1.49)
CAPS lifetime PTSD severity***		3.66 (7.06)	39.20 (21.00)
CAPS current PTSD severity***		1.62 (4.41)	13.67 (17.22)
Age at retirement (*SD*)	60.21 (5.71)	60.30 (4.75)	59.64 (5.54)
% retired for positive reason (*n*)	48.4 (30)	53.1 (156)	28.9 (13)
% retired for health-related reason (*n*)	12.9[b] (8)	11.9[c] (35)	26.7[d] (12)
% retired for other negative reason (*n*)	38.7[e] (24)	35.0[f] (103)	44.4[d] (20)

Note. The posttraumatic stress disorder (PTSD) group includes individuals who met criteria for a full or partial lifetime diagnosis. Odds ratios (ORs) for health-related retirement and other negative reasons were calculated relative to positive reasons using multinomial logistic regression. CAPS = Clinician-Administered PTSD Scale.
[a] $n = 294$ for retirement reasons. [b] OR = .29, $p < .05$. [c] OR = .24, $p < .01$. [d] Reference category. [e] OR = .52, *ns*. [f] OR = .43, $p < .05$.
*** $p < .001$.

Table 2
Regression Coefficients for Tests of Differences Among PTSD and Exposure Groups in Slopes During Preretirement, Peri-retirement, and Postretirement phases (N = 404)

	Psychological symptoms		Physical symptoms	
Slope	*B*	*SE*(*B*)	*B*	*SE*(*B*)
Preretirement				
No exposure	0.004	0.02	−0.15***	0.05
Trauma only	−0.01	0.02	−0.11**	0.04
PTSD	—		—	
Peri-retirement				
No exposure	−0.19*	0.08	−0.78***	0.16
Trauma only	−0.12*	0.06	−0.72***	0.12
PTSD	—		—	
Postretirement				
No exposure	0.02	0.04	−0.03	0.08
Trauma only	−0.01	0.03	0.001	0.07
PTSD	—		—	

Note. Dashes indicate that the posttraumatic stress disorder (PTSD) group, which included individuals who met criteria for a full or partial lifetime diagnosis, served as the reference category.
* $p < .05$. ** $p < .01$. *** $p < .001$.

findings add to prior retrospective studies that have implicated retirement as a factor in exacerbating PTSD symptoms in older veterans (Kaup et al., 1994; Macleod, 1994; Zeiss & Dickman, 1989): first, by demonstrating the retirement-related symptom increases in a longitudinal design and, second, by examining physical as well as psychological symptoms.

Psychological symptoms increased in the PTSD group only during retirement. However, overall symptom levels were low, even following the increase, and thus, we urge caution in interpreting the change as being clinically significant. We might have observed higher symptom levels if we had been able to use a more sensitive measure. The CMI may be insensitive to lower intensities of distress because its dichotomous items often focus on long-term trends. Symptom levels also might have been higher if we had studied a less select group. Men in the NAS were initially screened for good physical and mental health and thus are not representative of all older veterans. Another explanation for the low symptom levels is the inclusion of men with partial PTSD in the PTSD group to increase statistical power. We think this explanation is unlikely because individuals with partial PTSD have significant symptoms and functional impairment (Schnurr et al., 2000; Stein, Walker, Hazen, & Forde, 1997). Nevertheless, our findings may not generalize to other populations. Ideally, the question of whether psychological symptoms increase differentially in PTSD following retirement should be addressed in a large sample of veterans and nonveterans with separate full, partial, and no PTSD groups that are assessed longitudinally with valid measures of PTSD and other symptoms.

Relative to the trauma only and no exposure groups, the PTSD group had more physical symptoms overall, which is consistent with a growing body of evidence that PTSD is associated with poor physical health (e.g., Boscarino, 1997; Schnurr et al., 2000). Symptoms increased more in the PTSD group than in the other groups even before retirement, and the PTSD group also had a greater likelihood of retiring for health reasons. Taken together, these findings suggest an alternative interpretation: Individuals with PTSD retire because they are sicker in the first place. Although poor health does cause some people to retire, this is not a sufficient explanation. Our analyses accounted for the effect of between-groups differences in slopes prior to retirement, so the differences observed during retirement represent a change from the prior trajectories. Moreover, statistical adjustment for health-

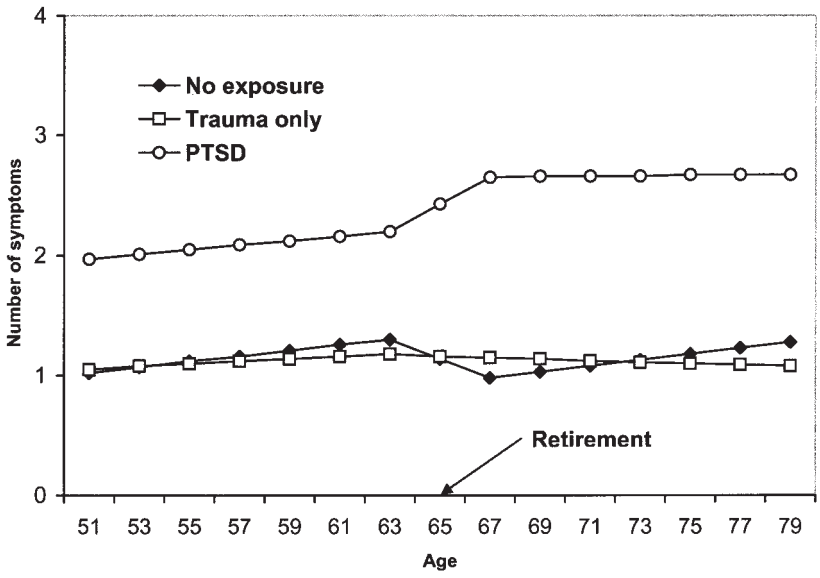

Figure 1. Predicted psychological symptoms as a function of trauma exposure and posttraumatic stress disorder (PTSD) in older veterans who retired at 65 years of age.

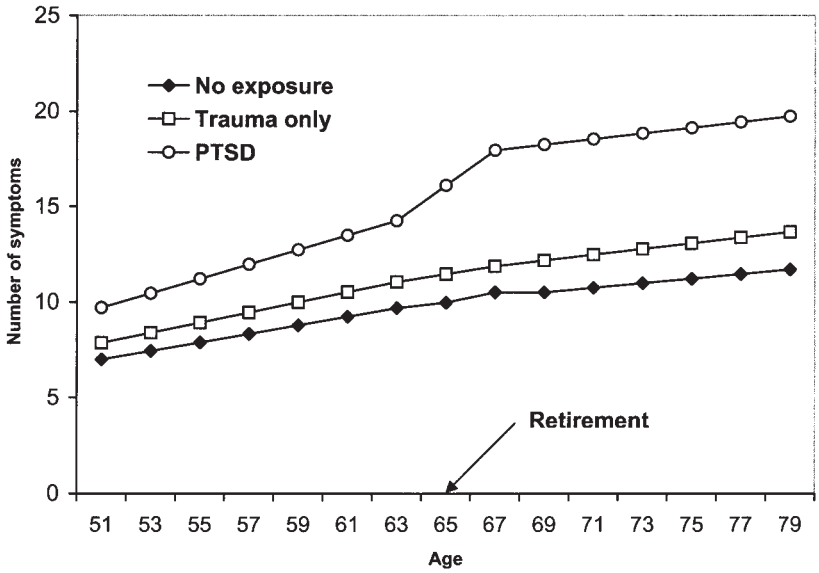

Figure 2. Predicted physical symptoms as a function of trauma exposure and posttraumatic stress disorder (PTSD) in older veterans who retired at 65 years of age.

related retirement did not eliminate the finding of relatively greater change in the PTSD group during retirement. Thus, our results are consistent with the hypothesis that retirement has negative effects on physical health in veterans with PTSD. These results are also consistent with prior findings showing that health status is not related to retirement plans or retirement in men (Midanik et al., 1995).

Clinicians should recognize and address the potential for individuals with PTSD to experience difficulties during retirement. We suggested above that retirement offers reduced distractions from trauma-related thoughts and feelings and even could trigger reminders of past trauma. Thus, education and additional supports for affected individuals and family members could be provided before a retirement transition takes place. Intensifying treatment (e.g., increasing medication dose) might be necessary. Encouraging patients to return to voluntary or part-time work may be appropriate in some cases. Targeting behavioral factors could be useful as well. Although retirement typically is associated with neutral or positive effects on health behaviors (e.g., Midanik et al., 1995), prior studies have not looked specifically at individuals with PTSD, who are at increased risk of engaging in poor health practices (Rheingold, Acierno, & Resnick, 2004). Future studies should replicate our findings and explore possible mechanisms through which retirement could adversely affect health in individuals with PTSD. Understanding these mechanisms would enhance our understanding of the long-term effects of PTSD and also suggest areas of intervention to prevent or reverse negative outcomes.

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Received April 13, 2004
Revision received December 16, 2004
Accepted December 20, 2004 ■

Correction to Koss and Figueredo (2004)

In the article, "Change in Cognitive Mediators of Rape's Impact on Psychosocial Health Across 2 Years of Recovery," by Mary P. Koss and Aurelio José Figueredo (*Journal of Consulting and Clinical Psychology*, 2004, Vol. 72, No. 6, pp. 1063–1072), several errors are present on pp. 1068–1071 that stem from incorrect numbers for final predicted values in the text and in Figure 2. The correct starting and ending values are provided in Table 1 below.

Table 1
Starting and Final Mean Per Item Score Estimates

Variable	Intercept	Final predicted value
Psychopathology	1.643	0.738
Posttraumatic Stress Symptoms	2.295	2.036
Social Maladjustment	2.113	1.738

These scores demonstrate a reduction from starting values on the Brief Symptom Inventory Global Severity Index and Social Maladjustment Survey (SAS) of approximately one standard deviation and one half standard deviation on posttraumatic stress disorder (PTSD). Although this amount of reduction was statistically significant, it does not meet the definition of clinically significant change that was cited on p. 1069. The major implication of the corrected values is that the statement in the Discussion section that the change in PTSD across time was highly clinically significant no longer stands. At the end of the follow-up period, rape survivors' scores were still equivalent to the PTSD present norm group. The statement in the last paragraph of p. 1071, point (b), should be corrected to state that the present results suggest an impact of rape on global distress and PTSD that was still detectable after 2 years, whereas both starting and final predicted values for SAS were within the normal range.